

Spectrum Management System for Developing Countries

(SMS4DC)

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Content of the presentation

- History of SMS4DC
- Main Functions of SMS4DC
 - Administrative Functions
 - Engineering Functions
 - Geographic Map Display functions
- Samples for the different functions
- How to obtain SMS4DC
- New capabilities of the Version 3
- Future developments



History

- ITU-R and ITU-D cooperation
- 1995 BASMS (FoxPro)
- 1997 WinBASMS
- WTDC March 2002: further developments
- 2002 ITU-R SG1: Rec. ITU-R SM.1604
- Consolidated technical specification: 2004
- 2007 first quarter: Version 1
- 2008 first quarter: Version 2
- 2009 third quarter: Version 3

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Main Functions of SMS4DC

- **Administrative Functions**
 - Relational database management,
 - Recording frequency application, frequency assignment, licensing, coordination data, import data from BRIFIC & SRS
 - Producing electronic notices, print license, invoice & spectrum fee
 - Security features: Multi level access enables system administrator to define users and groups with different access levels.

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Main Functions of SMS4DC

- **Engineering Analysis Function**
 - Enhanced analysis tools for frequency arrangement, assignment, coordination and interference calculation
 - Propagation models based on ITU-R latest recommendations available at the time of development, i.e. P.1546, P.370, P.530, P.452, P.526, extended HATA models for various service types and P.618-8 for Earth to space total attenuation calculation;
 - Coverage area, field strength, field strength contour, microwave link calculations, network coverage and best server calculation.

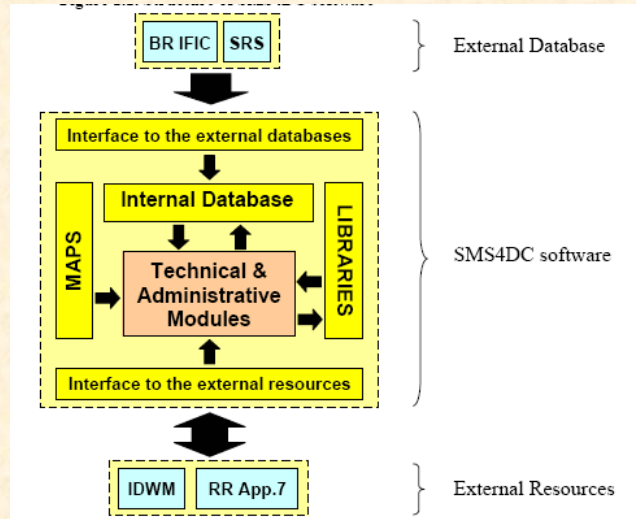


Main Functions of SMS4DC

- **Geographic Map Display Function**
 - User friendly interface, displaying of DTM, capability of importing standard mapping formats including Globe map and displaying of geographical maps,
 - Online latitude, longitude and altitude presentation, overlaying, Scrolling and Zooming functionality capability of handling vectors,
 - Providing multiple entry functions, menu items, assigning new stations on map and searching and displaying a station or group of stations on map.



STRUCTURE OF SMS4DC

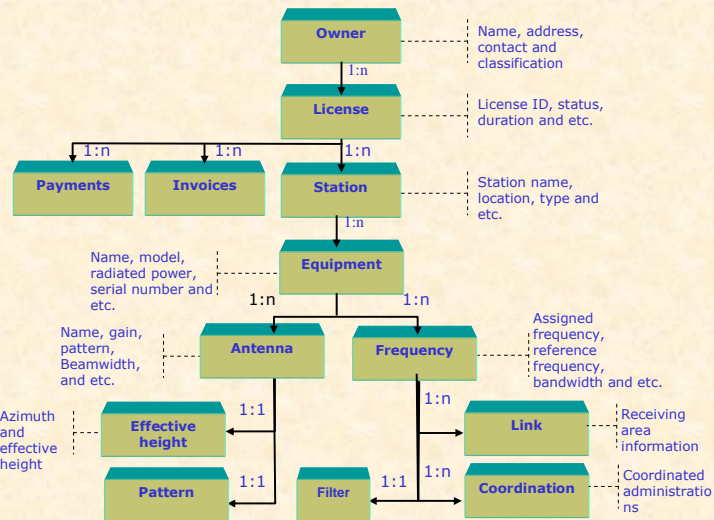


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User View of Data (terrestrial)

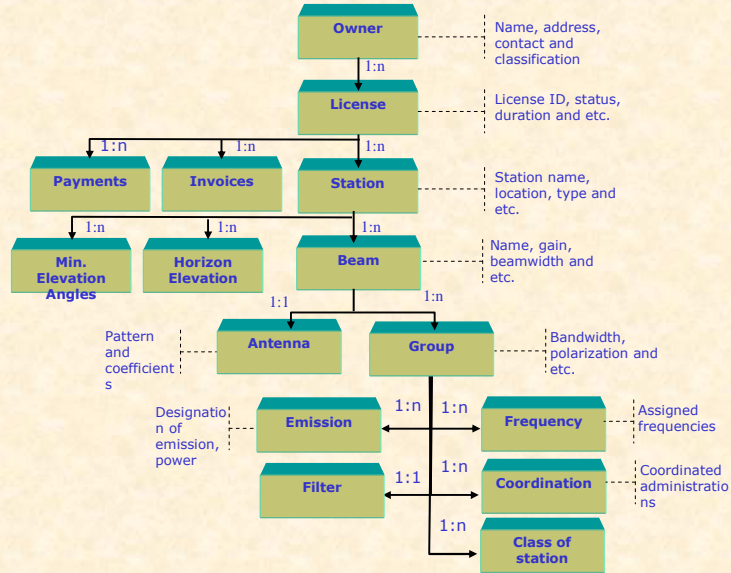


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User View of Data (earth stations)

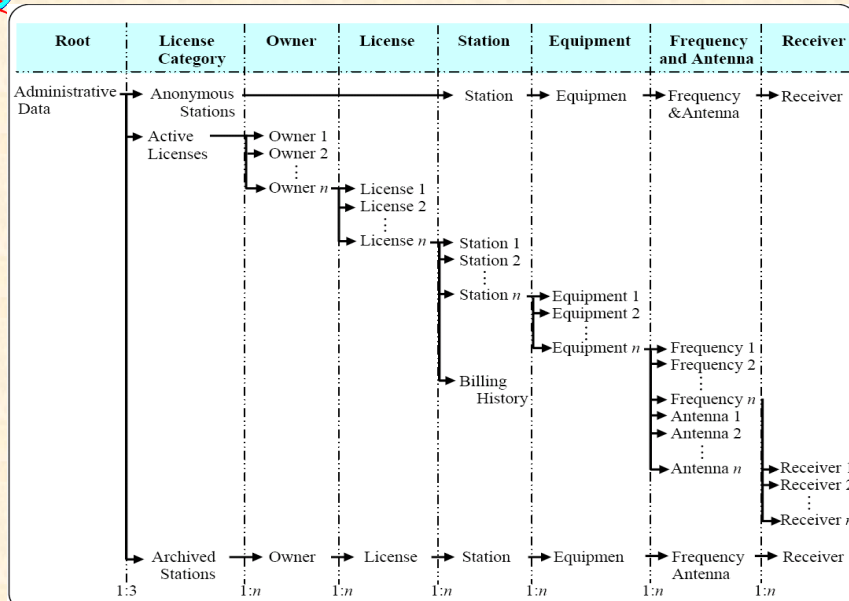


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Flow of Administrative Data Entry



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Samples of SMS4DC's Administration Functions

Supervisory tasks

- User access
- Audit control
- Backup/Restore

Audit trail

User Name: All Action: All Table: All

| User | Date/Time | Action | Record no. | Table |
|----------|---------------------|-----------------------------|------------|------------|
| Saman | 2005-10-11 09:24:18 | Update equipment | 1 | Equipment |
| Saman | 2005-10-11 07:29:26 | Update frequency | 30 | Frequency |
| Saman | 2005-12-11 21:50:39 | Update frequency | 43 | Frequency |
| Saman | 2005-12-11 21:51:13 | Update frequency | 44 | Frequency |
| Saman | 2005-12-11 21:52:29 | Update frequency | 43 | Frequency |
| Saman | 2005-12-11 21:52:58 | Update frequency | 44 | Frequency |
| admin | 2005-11-13 09:57:54 | Delete fixed/base station | 42 | Station |
| SMS4DC | 2005-11-14 04:47:13 | Update antenna | 6 | Antenna |
| SMS4DC | 2005-11-14 10:48:16 | Add payment | 6 | Payment |
| SMS4DC | 2005-11-14 14:08:54 | Delete license | 3 | License |
| SMS4DC | 2005-11-15 11:48:42 | Update frequency | 51 | Frequency |
| SMS4DC | 2005-11-15 11:48:55 | Update frequency | 51 | Frequency |
| SMS4DC | 2005-11-15 11:49:30 | Update frequency | 52 | Frequency |
| Somebody | 2005-11-21 08:31:46 | Update broadcasting station | 9 | B/CStation |
| Somebody | 2005-11-21 08:52:22 | Update broadcasting station | 2 | B/CStation |
| Somebody | 2005-11-21 10:06:49 | Update broadcasting station | 2 | B/CStation |
| Somebody | 2005-11-21 10:07:22 | Add equipment | 82 | Equipment |
| Somebody | 2005-11-21 10:08:54 | Add equipment | 83 | Equipment |
| Somebody | 2005-11-21 10:10:03 | Add antenna | 53 | Antenna |

Access levels

New

User Name:

User Password:

Modify

User Name: SMS4DC

User Password:

Access Level: 4 - Supervisor

Enabled

Delete Save Cancel

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Samples of SMS4DC's Administration Functions

Data capture screens

Owner information

Modify Cancel Save

| Field | Value |
|--------------------------|---------------|
| Owner Name | Admin2 |
| Owner Address | Enghelab Ave. |
| City | Tehran |
| Country | IRN |
| Telephone | 3243541 |
| Telex | |
| Fax | 5123451 |
| Email | x@c.com |
| Remarks | |
| Security Category | Y |
| Address Code | A |
| Code of Operating Agency | 001 |
| Billing | |
| Billing Name | Admin2 |
| Billing Address | Tehran |

Owner information

Modify Cancel Save

| Field | Value |
|----------------------------------|---------------|
| Nom du propriétaire | Admin2 |
| Adresse du propriétaire | Enghelab Ave. |
| Ville | Tehran |
| Pays | IRN |
| Téléphone | 3243541 |
| Télex | |
| Fax | 5123451 |
| Email | x@c.com |
| Remarques | |
| Niveau de sécurité | Y |
| Code d'adresse | A |
| Code de la compagnie exploitante | 001 |
| Billing | |
| Facturation au nom de | Admin2 |
| Adresse de facturation | Tehran |

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Samples of SMS4DC's Administration Functions

Fixed/Base Station Information Data Entry Table

Administrative data 1

Administrative data

- Anonymous Stations
- Active Licenses
 - Owner: Admin1
 - License: 456
 - License: 12345
 - License: 123
 - Owner: Admin2
 - Owner: Another owner
 - Owner: Sample audit
 - Owner: ministry of ICT
 - Owner: Test owner
 - Owner: asdfasdf
 - Archived Licenses

Fixed/Base station information

Modify Cancel Save

| | Value | Unit |
|-------------------|-------|--------|
| Admin Ref. ID | | |
| Site ID | | |
| Station Name | | |
| Call Sign | | |
| Class of Station | | |
| Station Type | | |
| Location | | |
| ITU region | | |
| Latitude | | Degree |
| Longitude | | Degree |
| Country | | |
| Radius of Service | | km |
| Height ASL | | m |
| Misc | | |
| Provision | | |
| Area of Trans. | | |
| Network ID | | |

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Samples of SMS4DC's Administration Functions

Mobile Station Information Data Entry Table

Administrative data 1

Administrative data

- Anonymous Stations
- Active Licenses
 - Owner: Admin1
 - License: 456
 - License: 12345
 - License: 123
 - Owner: Admin2
 - Owner: Another owner
 - Owner: Sample audit
 - Owner: ministry of ICT
 - Owner: Test owner
 - Owner: asdfasdf
 - Archived Licenses

Mobile station information

Modify Cancel Save

| | Value | Unit |
|-------------------|-------|--------|
| Admin Ref. ID | | |
| Mobile ID | | |
| Mobile Name | | |
| Call Sign | | |
| Class of Station | | |
| Station Type | | |
| Location | | |
| ITU Region | | |
| Latitude | | Degree |
| Longitude | | Degree |
| Country | | |
| Radius of Service | | km |
| Misc | | |
| Number of Sets | | |
| Provision | | |
| Network ID | | |
| Vehicle | | |
| Vehicle Model | | |
| Vehicle Plate | | |
| Vehicle Color | | |

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Samples of SMS4DC's Administration Functions

Broadcasting Station Information Data Entry Table

The screenshot shows a software window titled 'Administrative data1' with a tree view on the left and a data entry table on the right. The table is titled 'Broadcasting station information' and has columns for 'Value' and 'Unit'. The table contains the following rows:

| | Value | Unit |
|-------------------|-------|--------|
| Admin Ref. ID | | |
| Site ID | | |
| Station Name | | |
| Call Sign | | |
| Class of Station | | |
| Station Type | | |
| Location | | |
| ITU Region | | |
| Latitude | | Degree |
| Longitude | | Degree |
| Country | | |
| Radius of Service | | km |
| Height ASL | | m |
| Misc | | |
| Provision | | |
| Plan | | |

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Samples of SMS4DC's Administration Functions

Dialog box for importing data from BRIFIC (Terrestrial)

The screenshot shows a dialog box titled 'IFIC import' with several sections:

- Service:** Checkboxes for 'FM / TV' (checked), 'LF / MF', and 'FXM'.
- Administration:** A list box containing 'SMP', 'SNG', 'SDM', 'SRL', 'STP', and 'SUI'. 'SUI' is selected. Buttons for 'Add -->', '<-- Remove', and 'Clear' are present. A text field contains 'SUI'.
- Frequency conditions:** A list box with conditions like 'F > F1', 'F >= F1', 'F < F1', etc. A text field shows 'F = Assigned frequency' with a value of '150.000000 MHz <= F or F >= 151.000000 MHz'. Below are input fields for 'F1 = 150 MHz' and 'F2 = 151 MHz' with 'Add -->' and '<-- Remove' buttons.
- Class of Station:** A dropdown menu showing 'BT - Broadcasting station, television'. Below are 'Add -->', '<-- Remove', and 'Clear' buttons. A list box contains 'BC - Broadcasting station, sound' and 'BT - Broadcasting station, television'.
- Fragment:** A dropdown menu showing 'Article 11'. Below are 'Add -->', '<-- Remove', and 'Clear' buttons. A list box contains 'Article 11', 'Article 9', 'Geneva 1984', 'Geneva 1989', and 'Stockholm 1961'.
- Import progress:** A progress bar at the bottom.

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Samples of SMS4DC's Administration Functions

Electronic notices

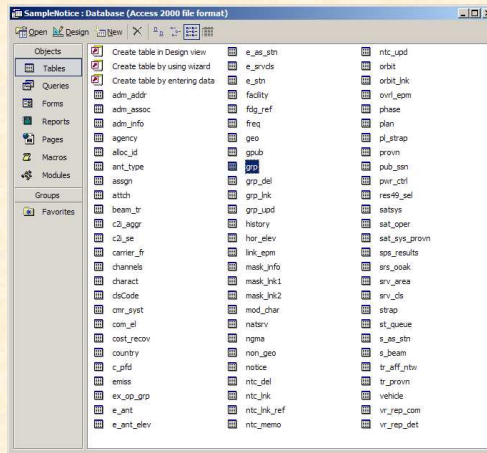
Fixed, Land mobile, Broadcasting

Earth station

```

SLIADD2006-03-11.txt - Notepad
File Edit Format View Help
<HEAD>
t_adm=IRN
t_d_sent=2006-03-11
</HEAD>
<NOTICE>
t_fragment=NITFD_RR
t_notice_type=T13
t_prov=RR11.9
t_action=ADD
t_is_resub=FALSE
t_freq_assign=150.000000
t_freq_carr=150.000000
t_d_unuse=2004-11-15
t_call_sign=Hello
t_site_name=Mobile1
t_eml_cls=F3E-
t_bdwth_cde=BK50
t_long=+0500000
t_lat=+300000
t_stn_cls=ML
t_nat_svr=CR
t_op_hh_fr=00:00
t_op_hh_to=24:00
t_addr_code=A
t_op_agcy=001
t_ctry=IRN
<ANTENNA>
t_pwr_xyz=X
t_pwr_ant=10.000000
t_pwr_dbw=10.000000
t_pwr_svr=I
</ANTENNA>
<NOTICE>
<TAIL>
t_num_notices=1
</TAIL>

```



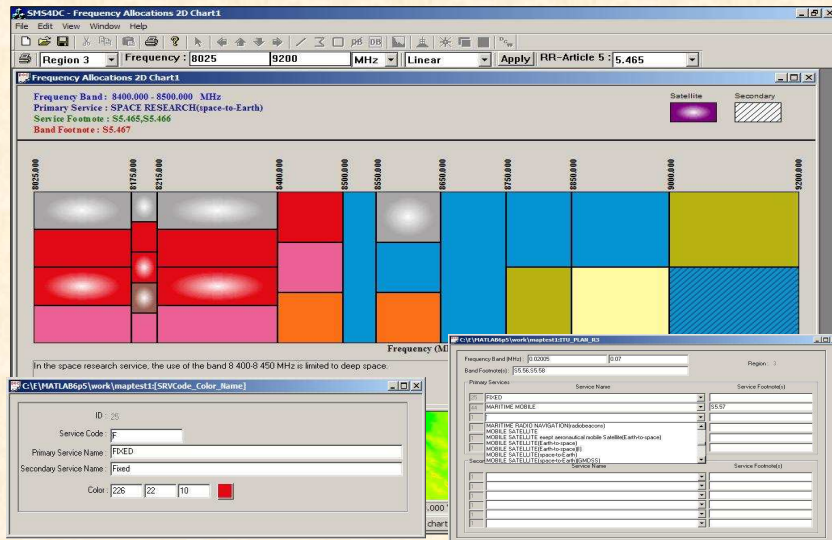
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Sample of SMS4DC's Engineering Functions

International & National frequency allocations table (chart)



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Sample of SMS4DC's Engineering Functions

Frequency arrangement (Homogeneous)

Frequency Plan

ID : 1 Frequency Plan ID : 382480.13 Region : Region 3 Service Priority : Primary

Service : Fixed

Type of Frequency Plan : Homogeneous

$F_n = F_o + F_{off} + n \cdot X_S$, $F'_n = F_o + F'_{off} + n \cdot X_S$

Channel Spacing X_S : 130 MHz

Reference Frequency F_o : 38248 MHz

Lower Frequency Offset F_{off} : -1260 MHz

Upper Frequency Offset F'_{off} : 0 MHz

Channels:

Number of Channels n : 40

First : 1 Last : 40 Channel Set : All

Comment :
CEPT Channel arrangement in 38 GHz Band-Homogeneous

Frequency List:

| No | F_n | F'_n | BandWidth |
|----|-------|--------|-----------|
| 1 | 36988 | 38248 | 130 |
| 2 | 37118 | 38378 | 130 |
| 3 | 37248 | 38508 | 130 |
| 4 | 37378 | 38638 | 130 |
| 5 | 37508 | 38768 | 130 |
| 6 | 37638 | 38898 | 130 |
| 7 | 37768 | 39028 | 130 |
| 8 | 37898 | 39158 | 130 |
| 9 | 38028 | 39288 | 130 |
| 10 | 38158 | 39418 | 130 |
| 11 | 38288 | 39548 | 130 |
| 12 | 38418 | 39678 | 130 |
| 13 | 38548 | 39808 | 130 |
| 14 | 38678 | 39938 | 130 |
| 15 | 38808 | 40068 | 130 |

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Sample of SMS4DC's Engineering Functions

Frequency arrangement (Uniform & non Uniform)

Frequency Arrangement

Frequency Plan ID : 400000.12 Region : Region 2 Service Priority : Primary

Service : Land Mobile

Type of Frequency Plan : Uniform

$F_n = F_o + n \cdot X_S$

Channel Spacing X_S : 120 MHz

Reference Frequency F_o : 40000 MHz

Channels:

Number of Channels n : 5

First : 1 Last : 10 Channel Set : Even

Comment :
Uniform Channel arrangement in 40 GHz

Frequency List:

| No | F_n | F'_n | BandWidth |
|----|-------------|--------|-----------|
| 2 | 40000.00000 | | 120 |
| 4 | 40120.00000 | | 120 |
| 6 | 40240.00000 | | 120 |
| 8 | 40360.00000 | | 120 |
| 10 | 40480.00000 | | 120 |

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Frequency Arrangement

Frequency Plan ID : 500000.15 Region : Region 1 Service Priority : Primary

Service : Fixed

Type of Frequency Plan : Non-uniform

Frequency List:

| No | F_n | F'_n | BandWidth |
|----|-------|--------|-----------|
| 1 | 49000 | 51000 | 150 |
| 2 | 49150 | 51150 | 150 |
| 3 | 49300 | 51300 | 150 |
| 4 | 49450 | 51450 | 150 |
| 5 | 49600 | 51600 | 150 |
| 6 | 49750 | 51750 | 150 |
| 7 | 49900 | 51900 | 150 |
| 8 | 50050 | 52050 | 150 |

Number of Channels n : 8

Comment :
Test2

6 of 7 Add Channel Double Channel

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Sample of SMS4DC's Engineering Functions

Frequency assignment parameters & EMC analysis results

Assignment Parameters

Fmin(MHz): 145 Fmax(MHz): 155
 Channel scan range(kHz): 15

Search Radius(km): 50
 Permissible field strength(dBμV/m): 20

OK Cancel

Assignment Results

List of Frequencies:

| No | F _n | F _h | Bandwidth | Num of Slabons | PlanID | Srv Priority |
|----|----------------|----------------|-----------|----------------|--------------|--------------|
| 1 | 148.0125 | 150.0125 | 0.0125 | 0 | 1490.0000125 | Primary |
| 2 | 148.025 | 150.025 | 0.0125 | 0 | 1490.0000125 | Primary |
| 3 | 148.0375 | 150.0375 | 0.0125 | 1 | 1490.0000125 | Primary |
| 4 | 148.05 | 150.05 | 0.0125 | 2 | 1490.0000125 | Primary |
| 5 | 148.0625 | 150.0625 | 0.0125 | 3 | 1490.0000125 | Primary |
| 6 | 148.075 | 150.075 | 0.0125 | 2 | 1490.0000125 | Primary |
| 7 | 148.0875 | 150.0875 | 0.0125 | 2 | 1490.0000125 | Primary |
| 8 | 148.1 | 150.1 | 0.0125 | 2 | 1490.0000125 | Primary |
| 9 | 148.1125 | 150.1125 | 0.0125 | 2 | 1490.0000125 | Primary |
| 10 | 148.125 | 150.125 | 0.0125 | 1 | 1490.0000125 | Primary |

List of Stations:

| No | ID | Name(2) | Service | Frequency | Coordinates | Dist. km | E1_2 | E2_1 | dE1_2 |
|----|----|---------|-------------|------------|------------------|----------|-------|-------|--------|
| 1 | 55 | LW2 | Land Mobile | 148.050000 | 049E2630 36N4530 | 17.4 | 8.07 | 11.00 | -11.93 |
| 2 | 59 | LW5 | Land Mobile | 148.062500 | 049E2900 36N4400 | 30.5 | 52.07 | 52.07 | 32.07 |
| 3 | 60 | FX1 | Fixed | 148.075000 | 049E2600 36N2730 | 30.3 | 3.23 | 6.24 | -16.77 |

Selected Station: Land Mobile
 Station Name(1): LW1
 Location: 049E1930 36N4300
 Emission: 8K30F3E-
 Frequency(MHz): 148.0125
 Selected Channel(MHz): 148.0625

No of Channels: Total: 40 With interference: 15

Permissible field strength: 20 (dBμV/m)

Assign Cancel

(a) Frequency assignment parameters

(b) EMC analysis result for assigning available planned frequencies to a concerned station



Sample of SMS4DC's Engineering Functions

Path profile with Fresnel Zone

SMS4DC - Profile9

HT_agl(m) = 300.0, Hr_agl(m) = 100.0, Freq.(MHz) = 150.000, k-factor = 4/3, Fresnel Zone Number = 1

Fresnel Zone Parameters

Transmitter Height_AGL (m): 300
 Receiver Height_AGL (m): 100
 Frequency (MHz): 150
 Fresnel Zone Number: 1

OK Cancel

Ready Lat(0) : 38° 14' 35.649" Lon(E) : 047° 54' 26.309" Alt(m) : 3432 Dist(km) : 10.832 19:40:44



Sample of SMS4DC's Engineering Functions

Link Calculation Dialog box using different propagation models

The screenshot displays three windows from the SMS4DC software. The 'Link Calculation (P530)' window shows a 3D terrain profile with a signal path between two points (Tx and Rx) over a distance of 112.869 km. The 'Reflection Points' window lists 13 ground reflection points with their coordinates, distances, and heights. The 'P530 - Availability' window shows rain and multi-path availability data for a specific location.

| No | Coordinates | Distance(d) | Distance(d) ² | Height_ASL(m) | Dists_Rlns | GravngAngle(deg) |
|----|-----------------|-------------|--------------------------|---------------|------------|------------------|
| 1 | 05IE011 3945641 | 1.067 | 1.138 | 1133.400 | 0.000 | 0.621 |
| 2 | 05IE031 3945645 | 1.552 | 2.418 | 1132.541 | 0.000 | 0.554 |
| 3 | 05IE034 3945648 | 1.838 | 3.378 | 1132.077 | 0.000 | 0.481 |
| 4 | 05IE032 3945650 | 3.063 | 9.382 | 1133.163 | 0.000 | 0.428 |
| 5 | 05IE023 3945630 | 3.122 | 9.747 | 1133.355 | 0.000 | 0.418 |
| 6 | 05IE033 3945638 | 3.906 | 15.257 | 1133.934 | 0.000 | 0.414 |
| 7 | 05IE108 3945623 | 5.473 | 29.856 | 1147.656 | 0.000 | 0.315 |
| 8 | 05IE304 3940400 | 33.525 | 1124.025 | 1271.425 | 0.016 | 3.126 |
| 9 | 05IE281 3940412 | 38.100 | 1451.610 | 1462.250 | 0.014 | 3.559 |
| 10 | 05IE300 3940405 | 38.131 | 1452.056 | 1503.716 | 0.014 | 3.921 |
| 11 | 05IE322 3940420 | 38.170 | 1454.944 | 1555.516 | 0.013 | 4.623 |
| 12 | 05IE328 3940422 | 38.172 | 1454.958 | 1593.252 | 0.012 | 5.426 |
| 13 | 05IE307 3940428 | 38.152 | 1453.552 | 1720.341 | 0.014 | 6.758 |

(e) Using ITU-R P.530, reflection points, availability calculation and text file profile data

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Sample of SMS4DC's Engineering Functions

The finest grid in "Antenna Editor" dialog box

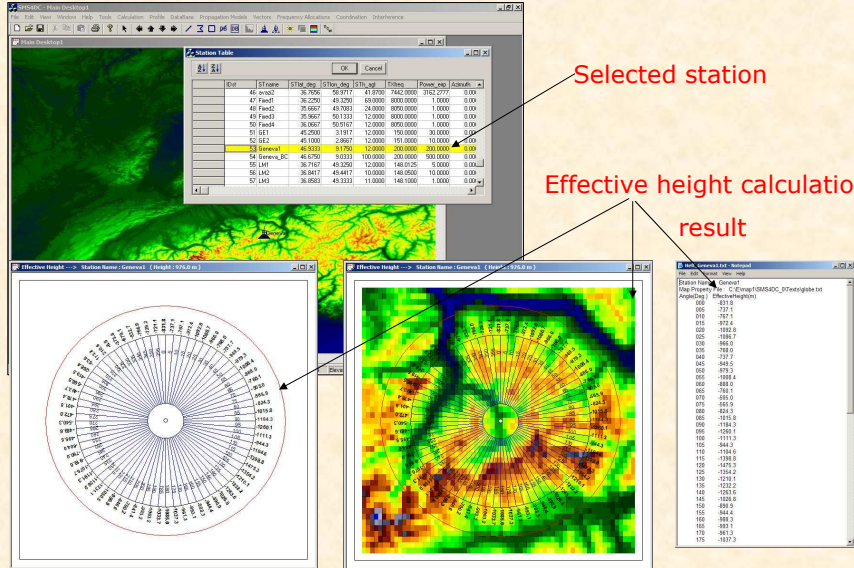
The screenshot shows the 'Antenna Editor' dialog box with a circular radiation pattern plot on the left and two 3D views of the antenna structure on the right. The dialog box includes fields for Name, Frequency Band, Beam Width, and a grid size of 0.000 x 0.000. The 3D views show a complex, multi-lobed antenna structure with a color gradient from red to blue.

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Sample of SMS4DC's Engineering Functions

Spreadsheet of stations



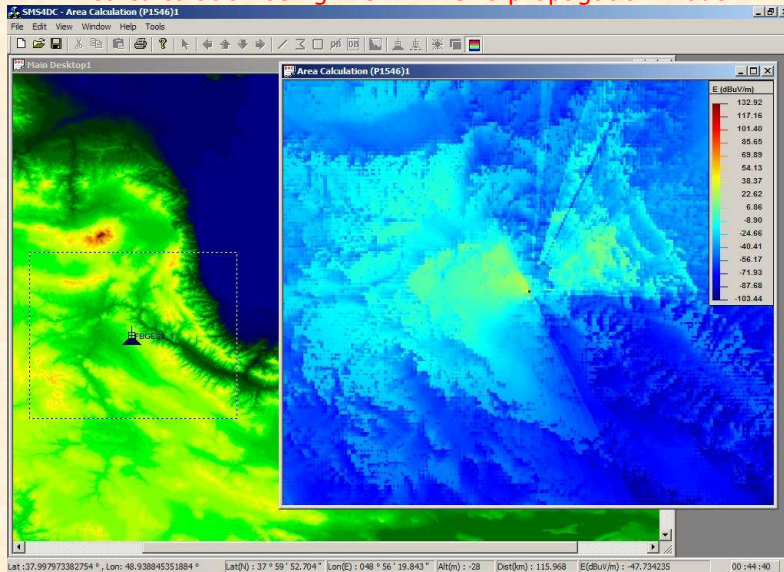
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Sample of SMS4DC's Engineering Functions

Area calculation using ITU-R P.1546 propagation model



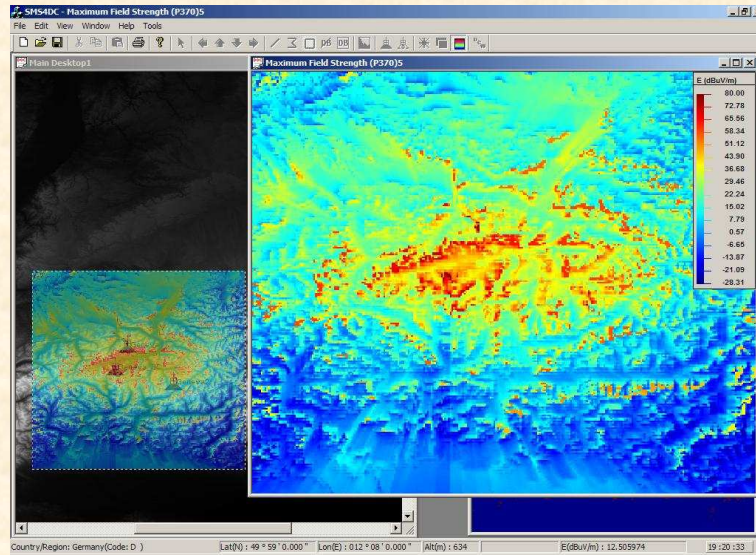
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Sample of SMS4DC's Engineering Functions

Network Processor : Maximum Field Strength



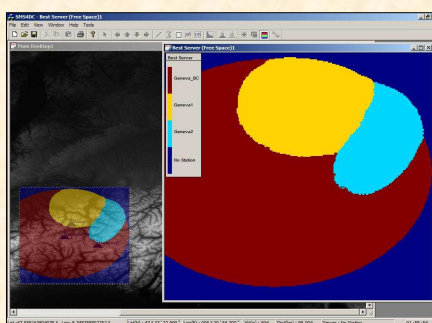
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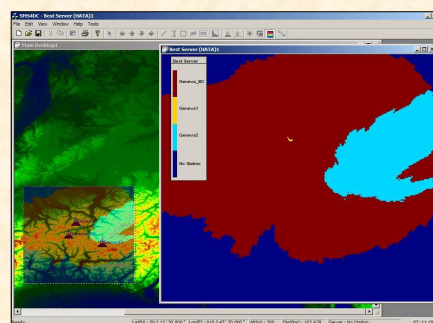


Sample of SMS4DC's Engineering Functions

Network Processor : Best Server



(a) Free-Space propagation model



(b) Okumura-Hata propagation model

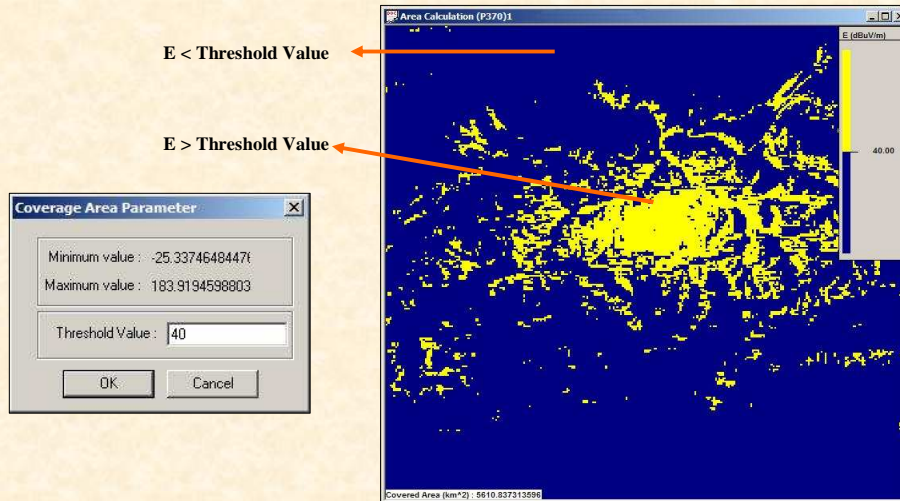
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Sample of SMS4DC's Engineering Functions

Coverage Area calculation



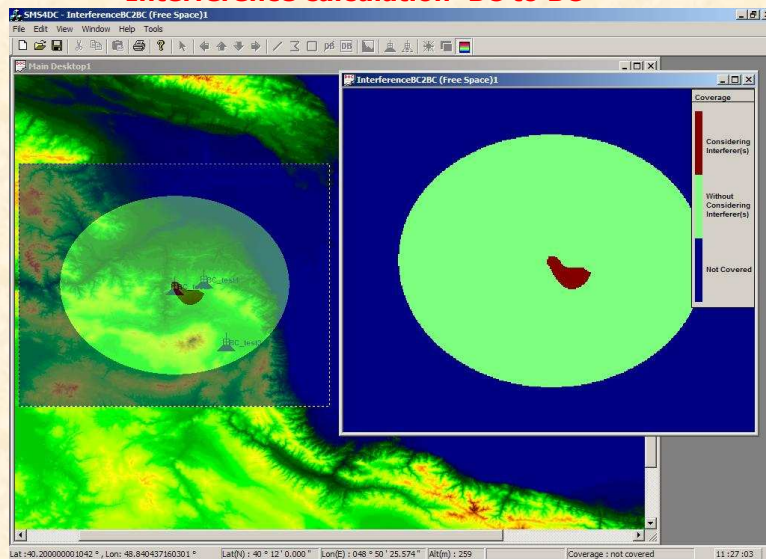
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Sample of SMS4DC's Engineering Functions

Interference calculation BC to BC



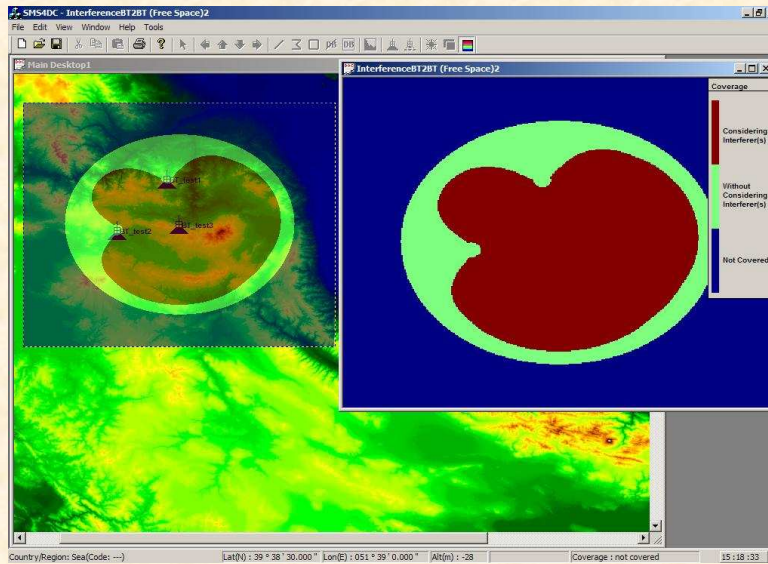
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Sample of SMS4DC's Engineering Functions

Interference calculation BT to BT



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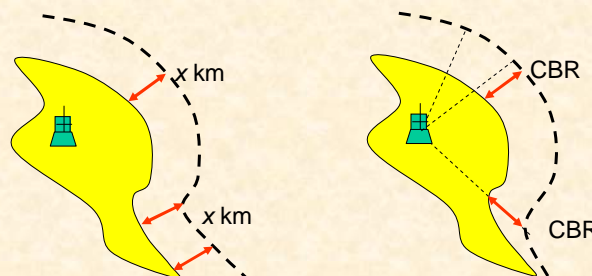
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Sample of SMS4DC's Engineering Functions

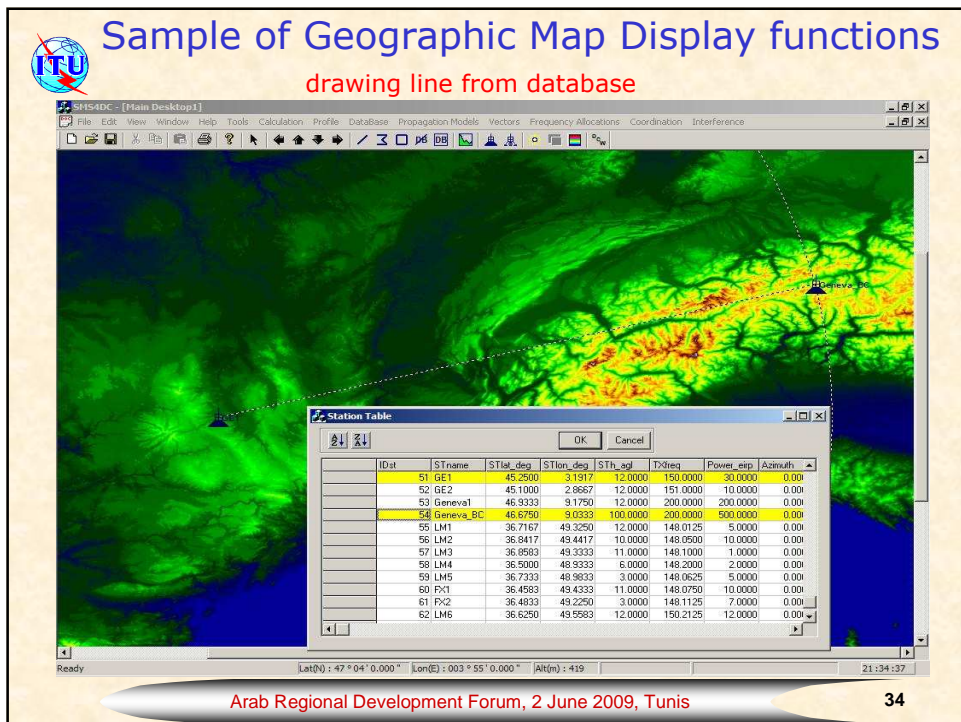
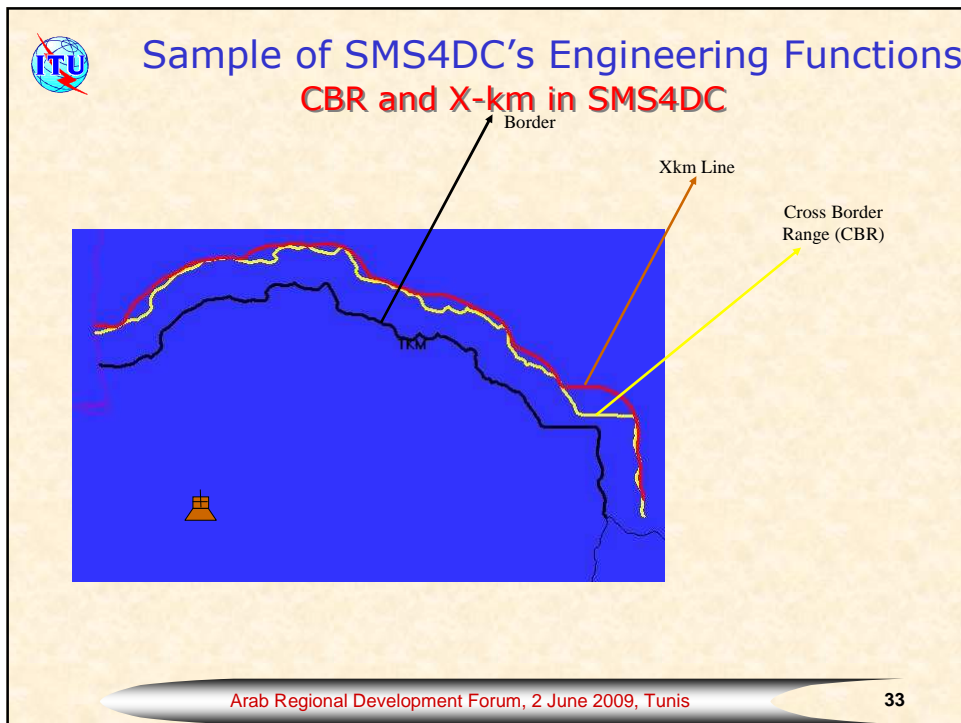
User define agreement Cross Border Range (CBR) & X-Km

- CBR: Locus of points with identical distance to the border along the line to TX
- X-km: Locus of points with identical distance to the nearest point of border



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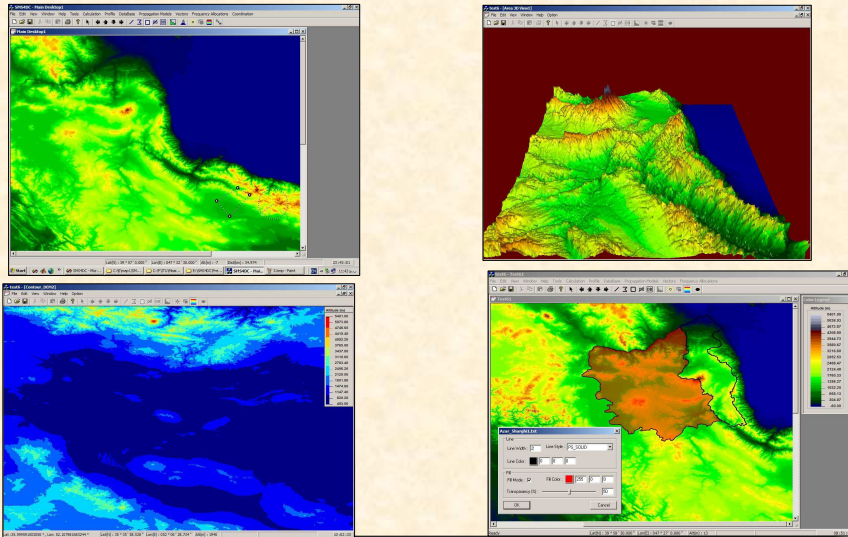
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Sample of Geographic Map Display functions

Topographical map of a selected area, relevant 3D view and vector overload



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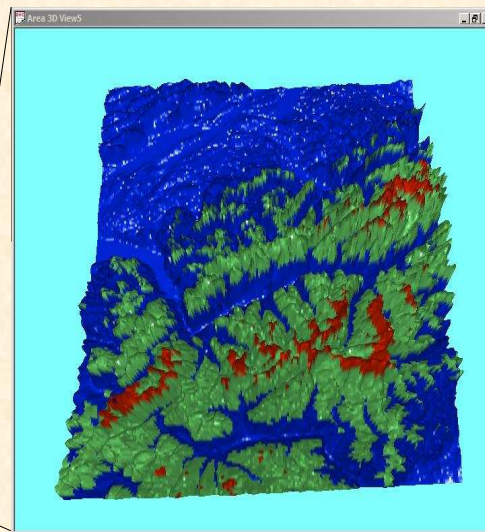
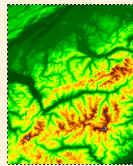
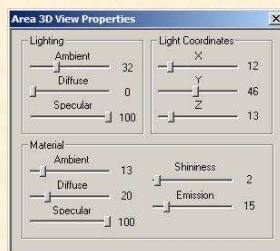
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Sample of Geographic Map Display functions

3D view of a selected area

Dialog box to adjust visual effects of 3D view

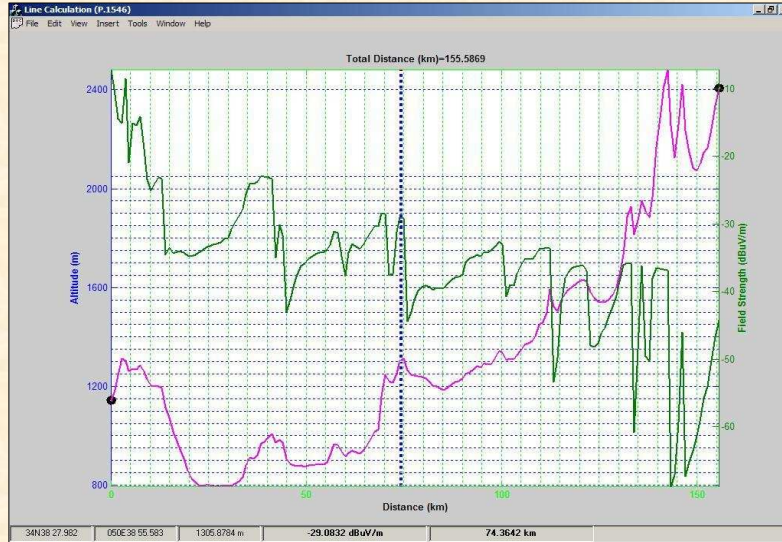


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Sample of Geographic Map Display functions Field Strength along a line



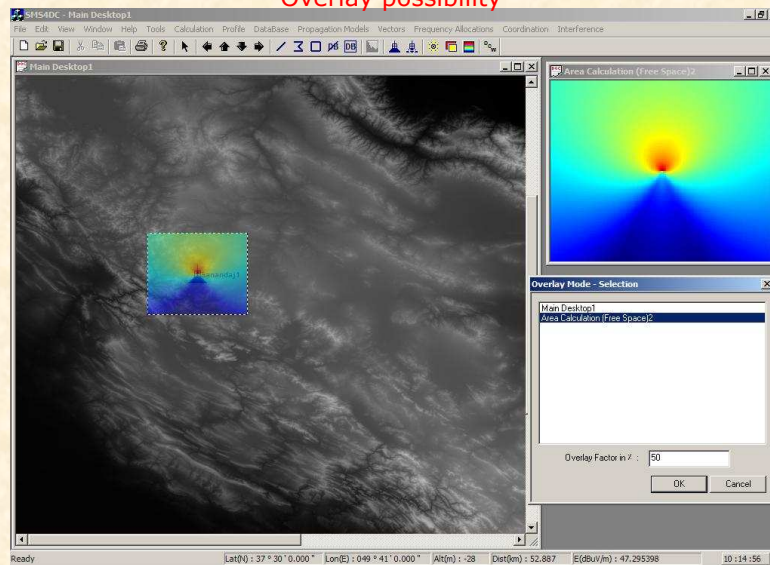
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Sample of SMS4DC's Engineering Functions

Overlay possibility



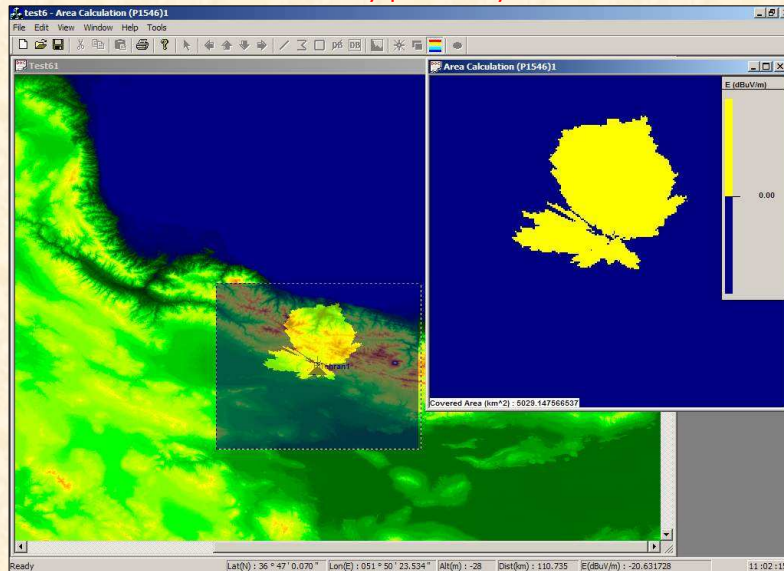
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Sample of Geographic Map Display functions

Overlay possibility



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GE06 REGIONAL AGREEMENT

- Relating to the planning of the digital terrestrial broadcasting service in Region 1 (parts of Region 1 situated to the west of meridian 170° E and to the north of parallel 40° S, except the territory of Mongolia) and in the Islamic Republic of Iran, in the frequency bands 174-230 MHz and 470-862 MHz

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GE06 AGREEMENT CALCULATIONS

Identification of administrations potentially affected by modifications to the Plans in respect to their

- broadcasting service
- other primary terrestrial services
(limits in Section I of Annex 4)

Identification of administrations potentially affected by modifications to the List

- When an administration proposes to change the characteristics of an *existing assignment to other primary terrestrial services*, or to bring into use a new assignment to *other primary terrestrial services* shall seek the agreement of any other administration whose broadcasting service is considered to be affected.



GE06 AGREEMENT CALCULATIONS

Coverage and service area calculation

Stage 1 – Calculation of noise-limited coverage area

Stage 2 – Identification of interferers

Stage 3 – Calculation of the test points for the interference-limited coverage

Calculation of interference caused by Interferer Station/ Assignment/Allotment to Victim Stations/Assignments/ Allotments

- BCBT to Digital BCBT or to Analogue BT;
- FXM to Digital BCBT or to Analogue BT;
- BCBT to FXM

Official results from the BR !

http://www.itu.int/publ/D-STG-SPEC/en/

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Spectrum Management System for Developing Countries (SMS4DC) - Version 2.0
Edition 2008 [Publication Notice with Order Form](#)

The Telecommunication Development Bureau (BDT) of the International Telecommunication Union (ITU) has released the second version of a harmonized, efficient, automated technical administrative tool for spectrum management in developing countries under the brand name SMS4DC (Spectrum Management System for Developing Countries). SMS4DC is a practical, user-friendly tool that is a great advance on the previous ITU spectrum planning product WinBASMS, offering more advanced and powerful functions. This second version of SMS4DC covers terrestrial fixed, mobile, sound and television broadcasting services in the bands above 30 MHz, including GE-06 as well as satellite Earth stations in space service. SMS4DC is sold as an integrated software package on CD-ROM, containing the software, a user manual and a digital terrain map of the world. SMS4DC software is available in English only, with the user manual also in English. No facilities or services regarding data migration or specific software support or training are included in this publication. It may be necessary for some users to obtain assistance in order to take full advantage of SMS4DC. ITU invites users having special needs to contact BDT to discuss specific assistance possibilities.

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| ITEM DETAIL | ARTICLE | PRICE | CART |
|---------------------------------------|---------|----------------|--------------------------|
| ENGLISH User Manual - Free of charge | | Free of charge | DOWNLOAD |
| User Manual - Free of charge | | Free of charge | DOWNLOAD |
| CD | 32814 | 4630 CHF | ADD |

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Annual licensing fee

**Annual licensing fee
in Swiss francs:**

**Catalogue Price (software) annual licensing fee: CHF 4,410.-
(for a single workstation)**

Member State Administrations and Sector Members: -15%
Administrations of the Least Developed Countries: -80%
Libraries of educational institutions: -80%

Price for software installed on one single or multiple workstation(s)

| Number of workstations* | 1 <input type="checkbox"/> | 2-3 <input type="checkbox"/> | 4-5 <input type="checkbox"/> | 6-10 <input type="checkbox"/> |
|--|----------------------------|------------------------------|------------------------------|-------------------------------|
| Annual licensing fee (in Swiss francs) | 4 410.- | 6 615.- | 7 497.- | 8 820.- |

* Please tick the appropriate box

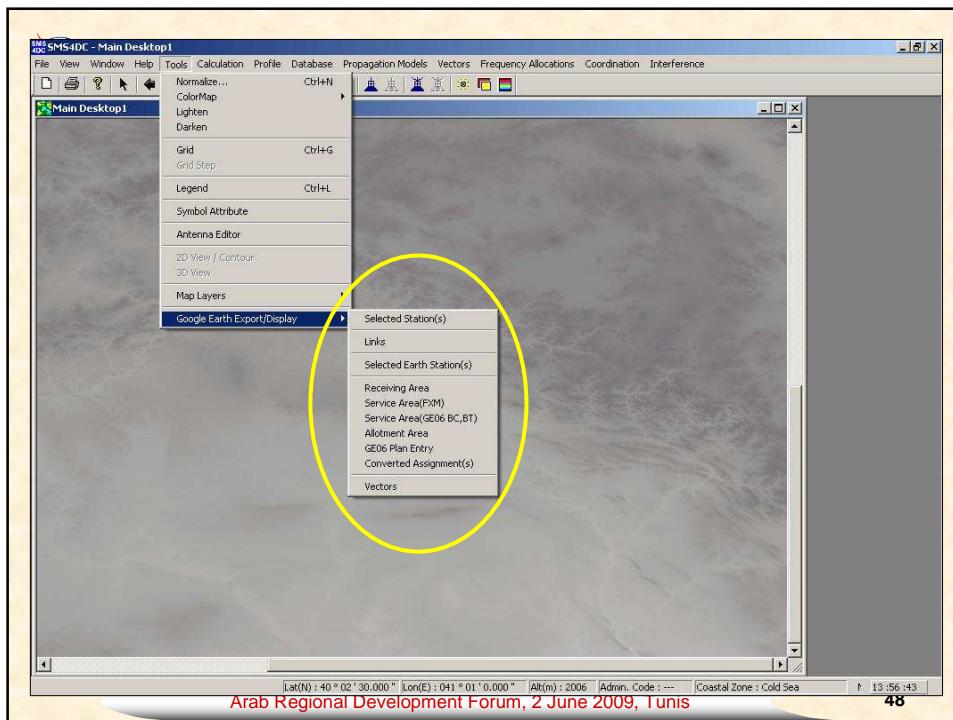


SMS4DC version 3.0 New/Modified Capabilities



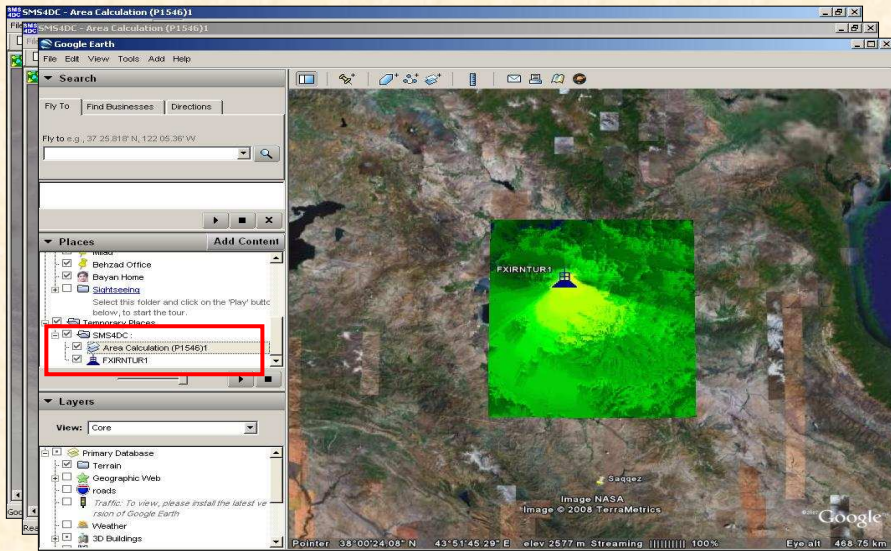
GoogleEarth Export

- Selected Stations (Including Earth Stations)
- Selected Links
- Receiving Area
- Service Area
- Allotment Area
- GE06 Plan Entry
- Converted Assignments
- Vectors
- Area Propagation Calculation (Free Space, Line of Sight, Former P.370, P.1546, Okumura-Hata), Maximum Field Strength Calculation, Best Server Calculation, Field Strength Contour
- GE06





Area Calculation (P.1546)

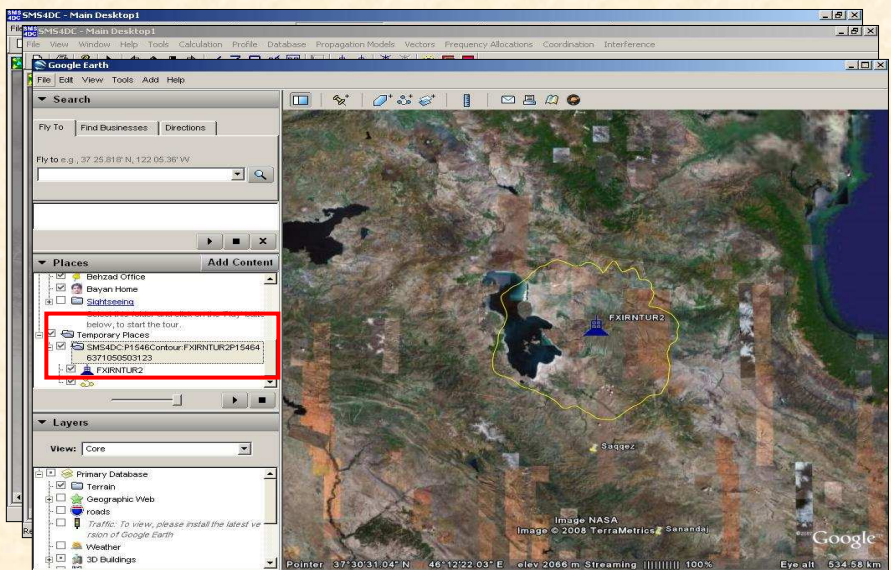


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Field Strength Contour(P.1546)

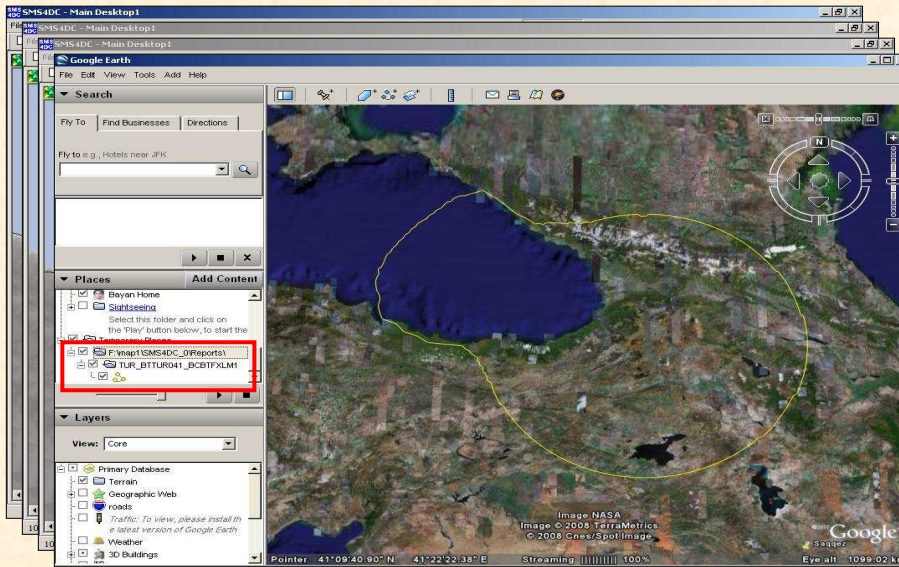


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GE06 (BCBT2FXLM)

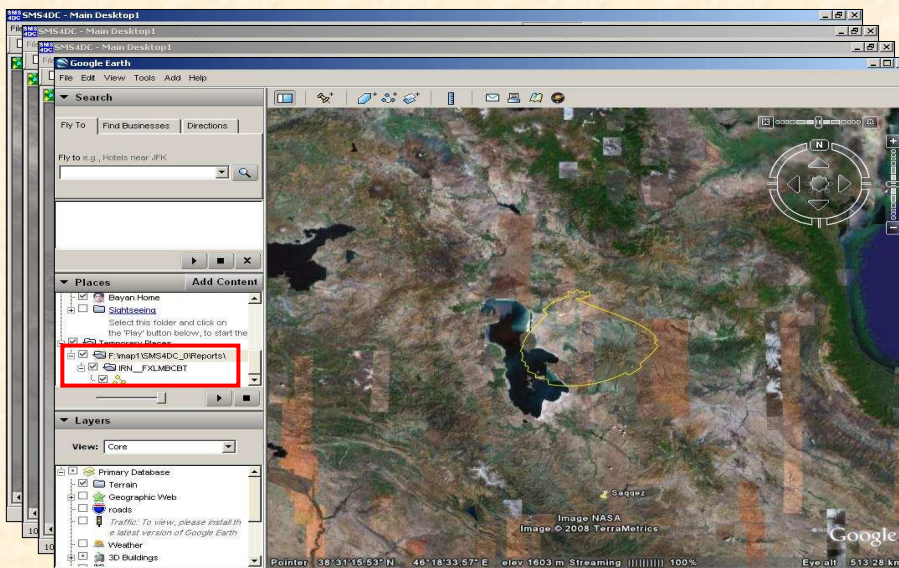


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GE06 (FXLM2BCBT_Tx)

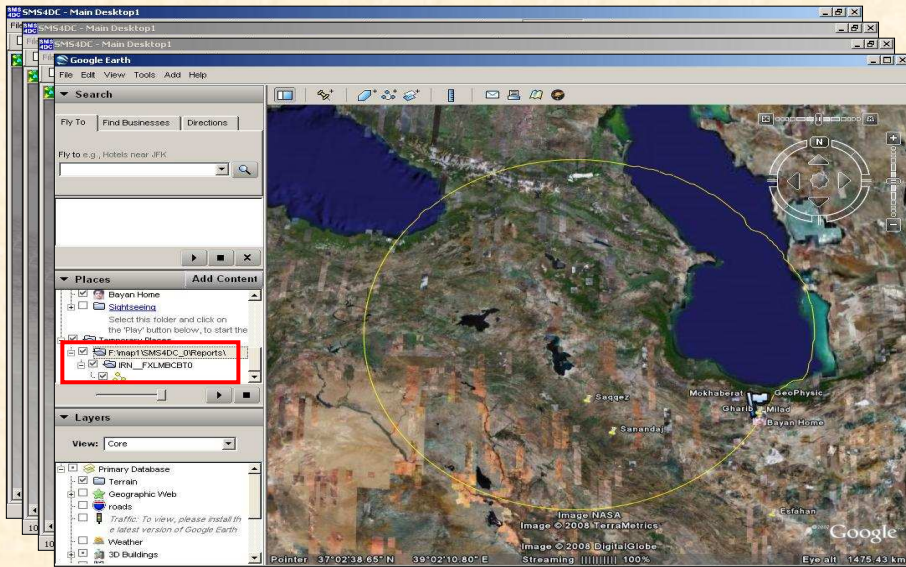


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GE06 (FXLM2BCBT_Rx)

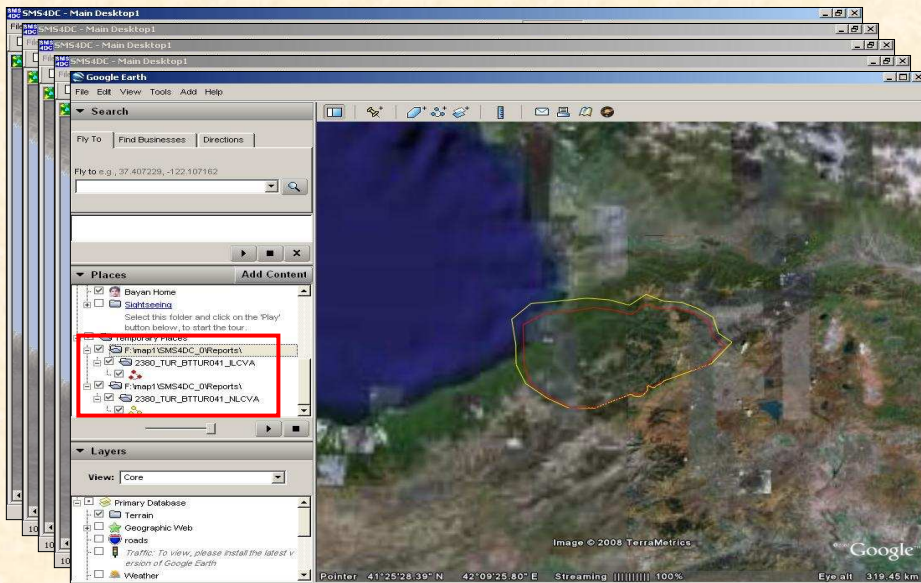


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GE06 (CoverageArea)



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ITU GE06 (ServiceArea)

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Other Changes/Additions

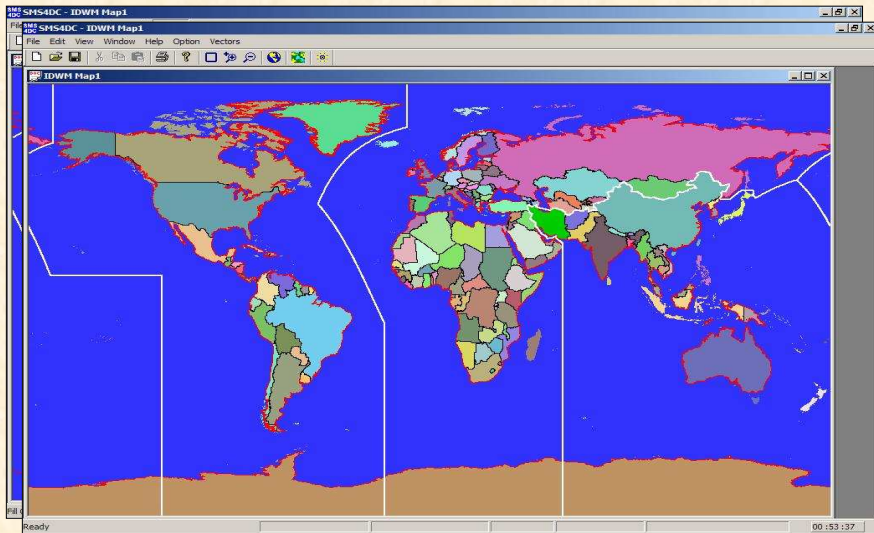
- Fill countries
- Horizon Elevation Calculation for ES
- Azimuth to GSO Satellite Calculation
- Elevation to GSO Satellite Calculation
- BR-IFIC Import

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Fill countries

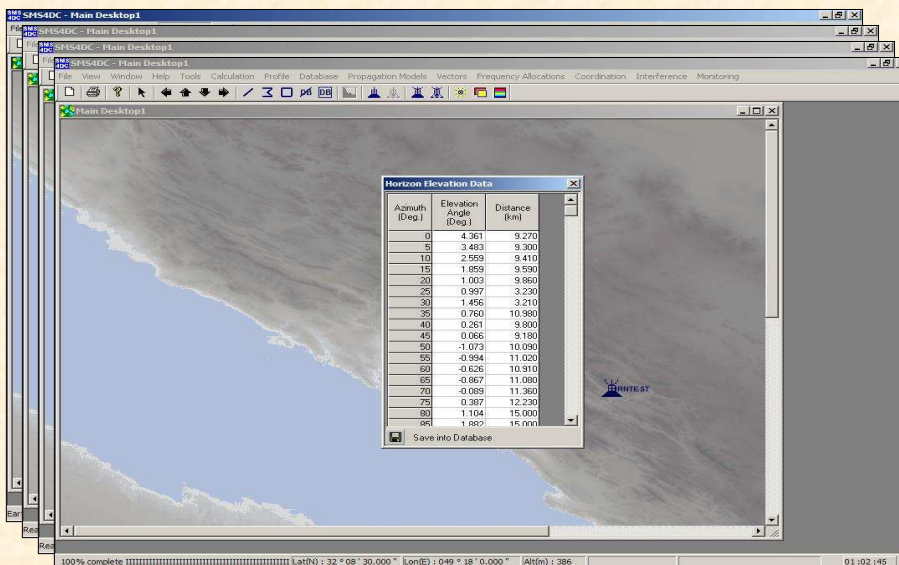


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Horizon Elevation Calculation for ES

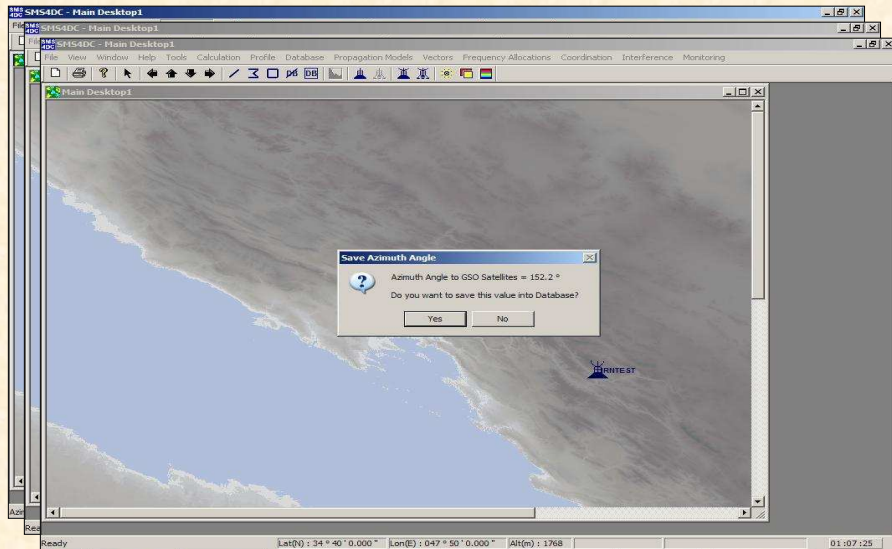


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Azimuth to GSO Satellite Calculation



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BR-IFIC Import

IFIC import

Service: FM/TV Allotments
 LF / MF
 F/M

Administration:
ABW/
AFG
AFS
AGL
AJA
ALB

Frequency conditions:
F = F1
F <> F1
F > F1
F >= F1
F < F1
F <= F1
F > F1 and F < F2
F >= F1 and F <= F2
F1, F2, F3, F4

F = Assigned frequency
F1 = MHz
F2 = MHz

Class of Station:

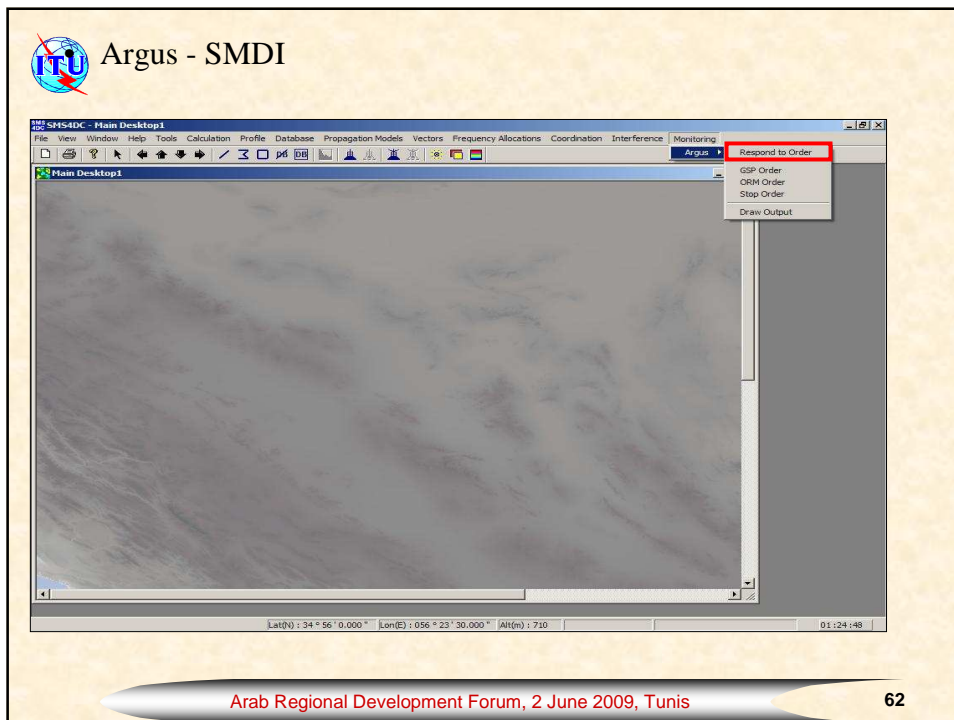
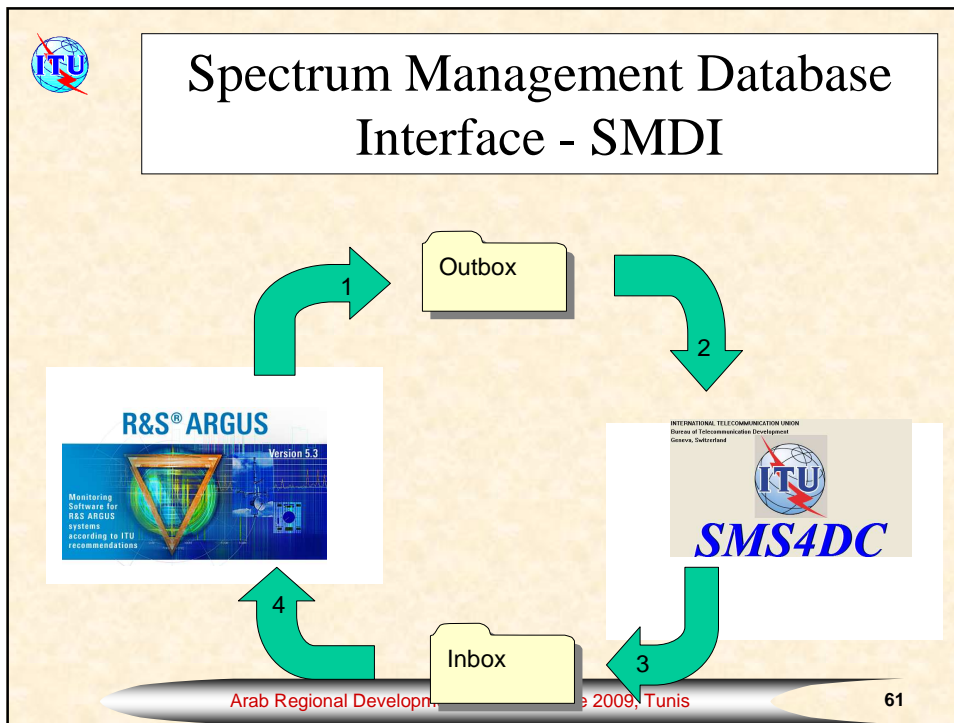
Fragment:

Assign ID:

Import progress:

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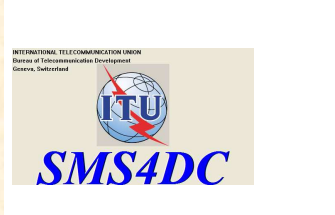
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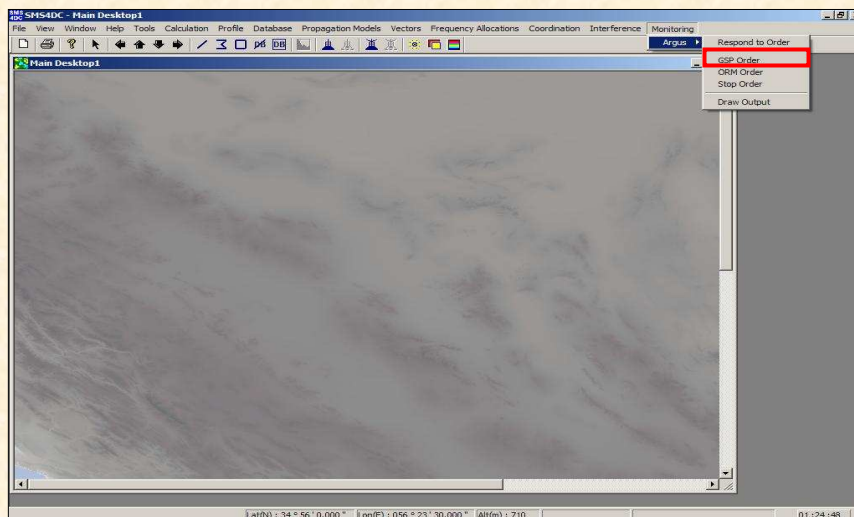


Order Report Module – ORM – 1

A- Get System Parameters (GSP)

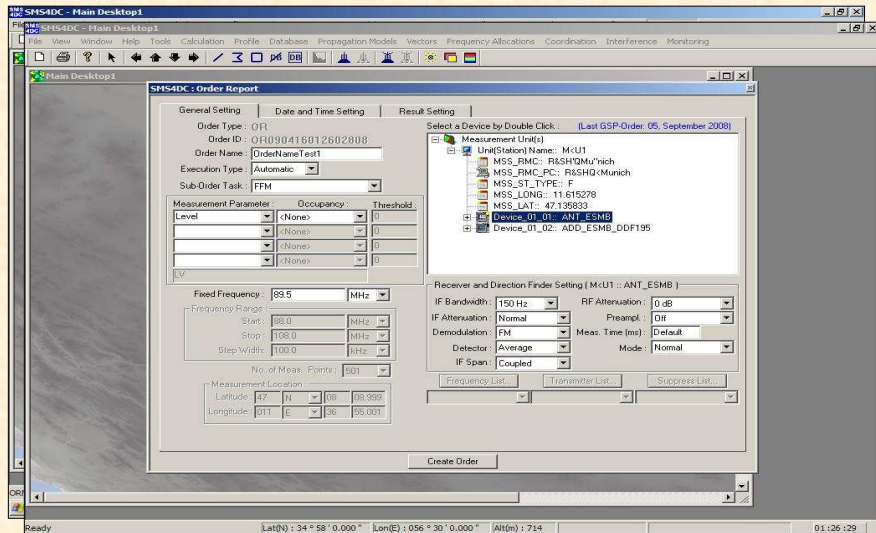


Argus - GSP





Argus - ORM

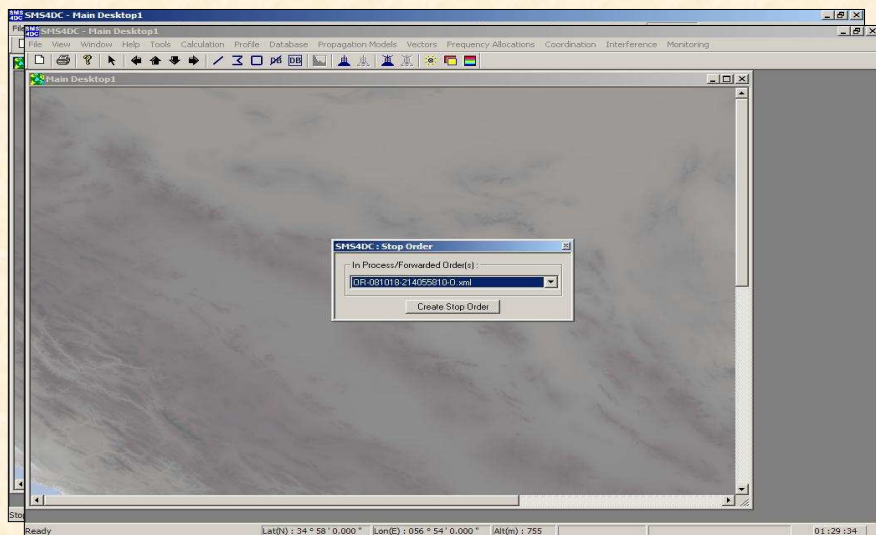


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Argus - STOP Order

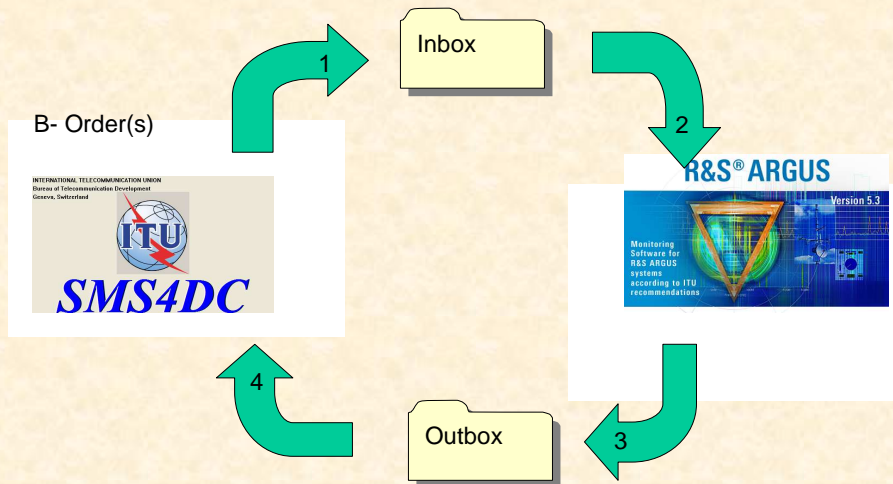


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Order Report Module – ORM – 2



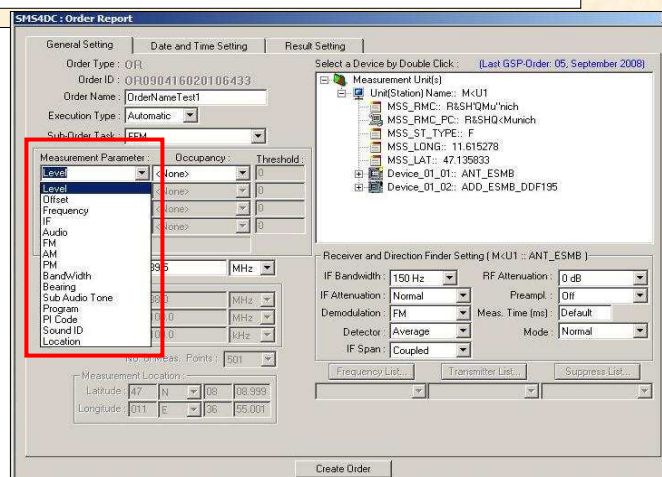
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ORM - parameters

- Level
- Offset
- Frequency
- IF
- Audio
- AM
- FM
- PM
- BandWidth
- Bearing
- Sub Audio Tone
- Program
- PI Code
- Sound ID
- Location

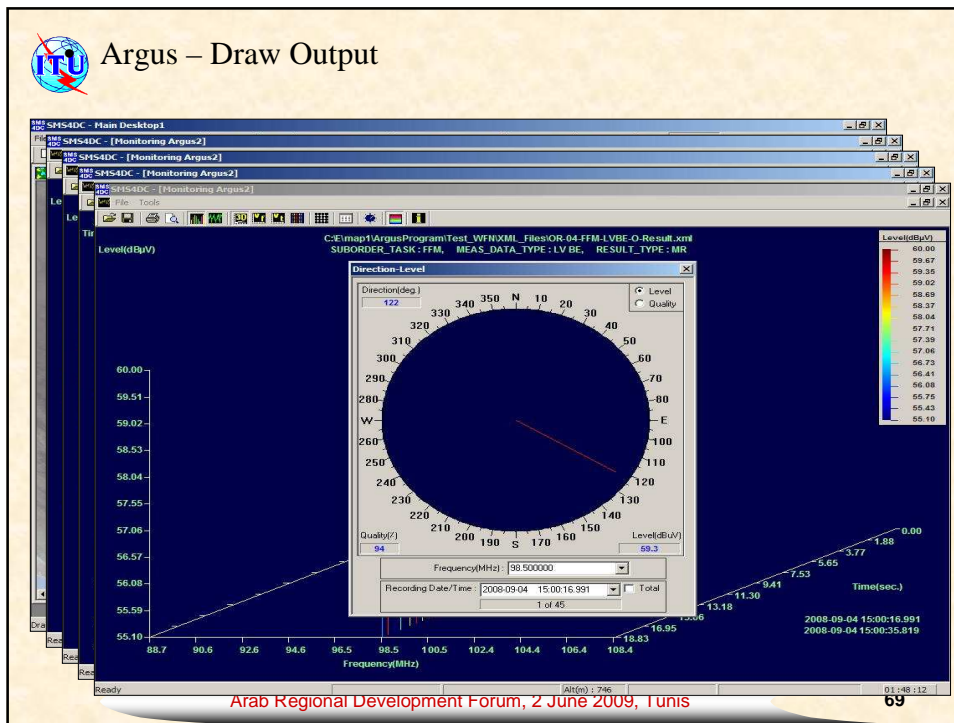


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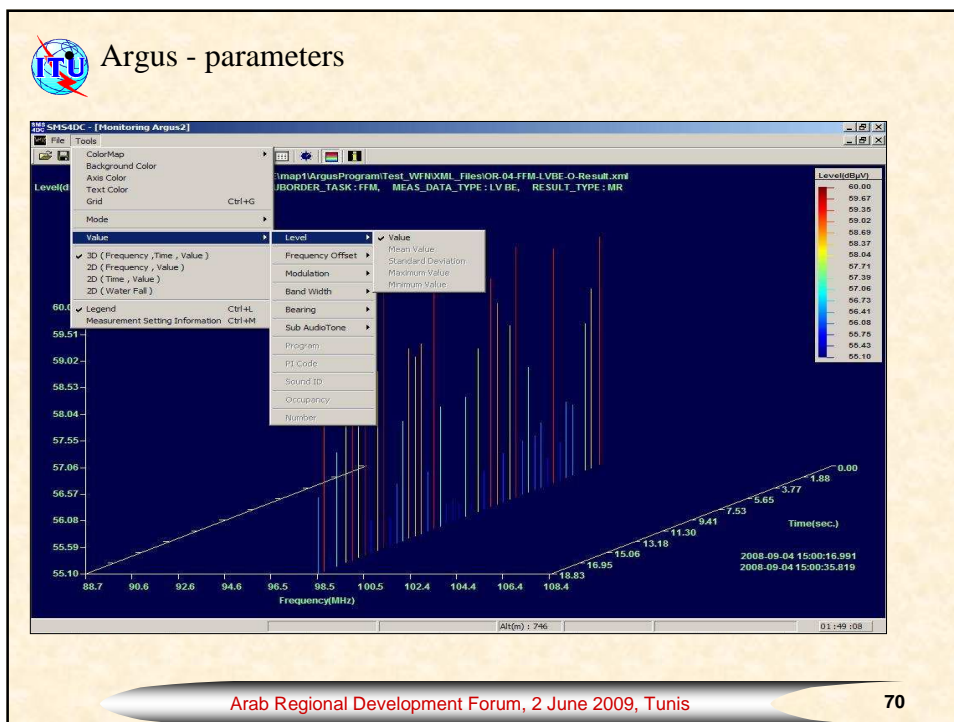
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Argus – Draw Output



Argus - parameters





Future developments

- Addition of new services (e.g. radionavigation, maritime mobile)
- Purchase follow-up
- SMS4DC web-site
- On-line training material



Thank you!

istvan.bozsoki@itu.int

<http://www.itu.int/ITU-D/tech/spectrum-management/SMS4DC.html>

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